EFFECT OF REGULAR CHILLI CONSUMPTION ON ENDOTHELIUM - DEPENDENT AND - INDEPENDENT VASODILATATION

Dominic P Geraghty, Kiran DK Ahuja, Rob G Fassett & Madeleine J Ball

School of Human Life Sciences, University of Tasmania, Launceston, Tas 7250.

Introduction

The active ingredient of chilli pepper, capsaicin, produces dose-dependent vasoconstriction in experimental animals (Griffiths et al, 1996). Although application of capsaicin locally to the skin induces vasodilation (Munce & Kennedy, 2003), there is no information available on the effects of regular capsaicin consumption (in the form of chilli) on vascular function in humans.

Aim

The aim of the present study was to determine the effects of chilli supplementation on endothelium-independent and endothelium-dependent vasodilatation.

Methods

Fifteen non-smokers (M/F 7/8; aged 47.3 ± 11.8 (±SD) years; weight 78.9 ± 14.2 kg; body mass index 27.3 ± 3.7 kg/m^2) with no history of hypercholesterolemia, diabetes mellitus or renal dysfunction consumed a chilli-free bland diet (normal diet with no chilli and minimal black pepper, ginger, etc) or chilli-supplemented diet (normal diet plus 30g/day 'Freshly chopped chilli' blend (MasterFoods®, Australia) for three weeks each. After three weeks on each diet, heart rate, fasting peripheral and central (aortic) blood pressure, augmentation pressure (AP), augmentation index (AIx), AIx at HR=75 beats per minute (AIx@HR75) and subendocardial viability ratio (Buckberg index) were determined using a sphygmomanometer and pulse wave analysis (SphygmoCor, AtCorMedical, Australia) (Wilkinson et al, 2002). AIx and subendocardial viability ratio (SEVR) are measures of arterial stiffness and coronary perfusion, respectively.

Results

After adjusting for order and period of diet, mean (±SD) baseline AIx (23.97 ± 10.56) and AIx@HR75 (15.77 ± 8.59) were significantly lower ($P < 0.05$, general linear model) after the chilli diet compared to the chilli-free diet (AIx, 27.97 ± 10.45; AIx@HR75, 19.40 ± 7.87). All parameters were then measured at regular intervals for 30 min after sublingual GTN (600 µg) and for 20 min after inhaled salbutamol (200 µg). Although AIx and AIx@HR75 at ten and 15 min after GTN was lower on the chilli diet compared to the bland diet, there was no difference in the maximal change in any of the measured parameters or overall vasodilator response (area-under-the-curve) in response to GTN or salbutamol between the two diets.

Conclusion

These results suggest that regular chilli consumption reduces baseline vascular stiffness but has no significant effect on either endothelium-independent or -dependent vasodilatation.

Griffiths, CD et al (1996). Life Sci 59, 105-17.
Munce, TA, and Kenney, WL (2003). J Gerontol A Biol Sci Med Sci 58, 304-10.
Wilkinson, IB et al (2002). Arterioscler Thromb Vasc Biol 22, 147-52.

Figure 1

Effects of glyceryl trinitrate and salbutamol on systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), augmentation index corrected for heart rate of 75 beats/min (AIx@HR75), and subendocardial viability ratio (SEVR). Data as mean ± SEM; * significantly different from bland diet (analysed with general linear model while adjusting for order and period of diet).